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RADIOCOMMUNICATIONS AND SEARCH AND RESCUE

Information on the GMDSS performance of Inmarsat Ltd

Note by the International Mobile Satellite Organization (IMSO)

SUMMARY

Executive summary: This document provides information on the performance by Inmarsat Ltd of the company's obligations for the provision of maritime services within the GMDSS, as overseen by IMSO. The information covers the period since privatisation of Inmarsat on 15 April 1999 to 31 December 1999. It is assessed that, during this period, Inmarsat Ltd has continued to provide a sufficient quality of service to meet its obligations under the GMDSS.

Action to be taken: Paragraph 5.1

Related documents: None

1 INTRODUCTION

1.1 This document is the first formal report to IMO by the International Mobile Satellite Organization (IMSO) on the performance by Inmarsat Ltd of that company's public service obligations in respect of the GMDSS, as established in Article 3(a) of the Convention on the International Mobile Satellite Organization, as amended, and clause 2.1.2 of the Public Services Agreement (PSA), (annex). This first report covers the period from privatisation of Inmarsat on 15 April 1999 to 31 December 1999.

1.2 At its Twelfth Session in April 1998, the Inmarsat Assembly adopted amendments to the Inmarsat Convention and Operating Agreement which were intended to transform the Organization's business into a privatised corporate structure, while retaining intergovernmental oversight of certain public service obligations and, in particular, the GMDSS. The Assembly and Council of Inmarsat subsequently decided to implement the amendments as from 15 April 1999, pending their formal entry into force in accordance with the requirements of the Convention. In doing so, it was recognised that early implementation of the new structure was needed to maintain the commercial viability of the system and thereby ensure continuity of GMDSS services and other public service obligations, namely: peaceful uses of the system, non-discrimination, service to all geographical regions and fair competition.

1.3 The restructuring of Inmarsat involved the incorporation of holding and operating companies, located in England and registered under British law on 15 April 1999, as planned. On the same day, the Headquarters Agreement between the United Kingdom Government and the IMSO was signed. A Public Services Agreement between IMSO and the privatised Inmarsat was also signed with immediate effect. The Operating Agreement was terminated and the Signatories received ordinary shares in the privatised Inmarsat in exchange for their investment shares. Future capital requirements will be met by existing shareholders, strategic investors and public investment through a listing of the shares on a stock exchange (IPO) within about two years from the date of privatisation.

1.4 The Inmarsat satellites and all other assets of the former IGO have been transferred to the privatised operating company which continues to manage the global satellite communications system for the future.

1.5 The intergovernmental organization (IMSO) continues with 87 parties, operating through the Assembly of Parties, its Advisory Committee and a small Secretariat, headed by the Director who is the legal representative of the Organization. Under the relevant provisions of the Convention, as amended, the Public Services Agreement and the Articles of Association of the company, IMSO is charged with overseeing, and under some circumstances may enforce fulfilment of some of the company's public service obligations and, in particular, GMDSS services. In performing this role, IMSO acts as the natural ally of IMO and watchdog of proper provisions and implementation of IMO's requirements in respect of the GMDSS by Inmarsat Ltd.

1.6 To this end, Parties to the IMSO Convention have requested the Director of IMSO to report on an annual basis to IMO on the performance of Inmarsat Ltd with respect to the provision of GMDSS services by the company. The format of the report, as approved by the Parties, includes the following:

(a) availability figures for each service/ocean region;
(b) number of Coast Earth Stations providing GMDSS Services;
(c) number of ship earth stations and EPIRBs;
(d) amount of distress priority calls/alerts through the system; and
(e) analyses and conclusions concerning the implementation by Inmarsat Ltd of standards, services and systems in respect of the GMDSS.

2 STATUS OF THE INMARSAT NETWORK

2.1 As background to the discussion of the specific performance measures called for by the IMSO Parties (section 3 below), the operational status of the space and ground segments of the Inmarsat Ltd systems is summarized in the table below:

		AOR-E	**POR**	**IOR**	**AOR-W**
OPERATIONAL SATELLITES		INMARSAT-3 F2 15.5ºW	INMARSAT-3 F3 178ºE	INMARSAT-3 F1 64ºE	INMARSAT-3 F4 54ºW
SPARE SATELLITES		INMARSAT-3 F5 25ºE	INMARSAT-2 F1 179ºE	INMARSAT-2 F3 65ºE	INMARSAT-2 F2 98ºW
OCEAN REGION CODES	TELEPHONE TELEX	871 581	872 582	873 583	874 584
INMARSAT-A	NCS	SOUTHBURY	YAMAGUCHI	YAMAGUCHI	SOUTHBURY
INMARST-M/B	NCS	SOUTHBURY	SANTA PAULA	THERMOPYLAE	SOUTHBURY
INMARSAT-C	NCS	GOONHILLY	SENTOSA	THERMOPYLAE	GOONHILLY
INMARSAT-E	CES	RAISTING GOONHILLY	PERTH NILES CANYON	PERTH RAISTING	NILES CANYON GOONHILLY

2.2 The table shows four Inmarsat-3 satellites in the primary locations over four ocean regions. However, Inmarsat Ltd is now operating two of the spare satellites, and one other not included in the table, to provide non-GMDSS services. To optimise these other commercial services, Inmarsat Ltd has moved the spare satellites in the Atlantic Ocean Region East (AOR-E) and WEST (AOR-W), which were previously co-located near the primary satellites, to orbital locations distant from the primary satellites in these regions.

3 PERFORMANCE OF THE INMARSAT NETWORK

3.1 Availability figures for each service / ocean region

The availability of all distress alerting/GMDSS components within the Inmarsat Ltd system is shown in the following table:

	AOR-E	IOR	POR	AOR-W
SPACE SEGMENT	100.00%	100.00%	99.9962%	99.9994%
INMARSAT-A	100.00%	100.00%	100.00%	99.9987%
INMARSAT-B/M	99.9932%	99.9882%	99.9869%	99.9844%
INMARSAT-C	99.9785%	99.9977%	99.9992%	99.9960%
INMARSAT-E	100.00%	100.00%	100.00%	100.00%

The definition of availability and methods of calculation are based on the approach adopted in section 3.5 of CCIR Report 918 (MOD F) "Availability of Communications Circuits in the Maritime Mobile Satellite Service", dated 15 December 1989.

In practice, these figures indicate 7 minutes non-availability of Inmarsat-A in the AOR-W. Similarly, Inmarsat-B service was not available in the AOR-W for 82 minutes during the year. Inmarsat-C is the most important GMDSS service and therefore provides the most critical measure of performance in this table. The availability of Inmarsat-C has been generally satisfactory in the IOR, POR and AOR-W. In the AOR-E, however, Inmarsat-C service was not available for a total of 113 minutes during the year, the longest single period of non-availability being 95 minutes. The universal figure of 100% availability for Inmarsat-E is a direct result of the way the system has been engineered to have complete duplication of every critical function.

3.2 Number of Coast Earth Stations providing GMDSS Services

73 Inmarsat-A, 83 Inmarsat-B/M, 48 Inmarsat-C and 8 Inmarsat-E Coast Earth Stations (CESs), located at various sites world-wide, provide the essential ground-based gateways for GMDSS related communications using basic telex, telephony and message transfer services. The figures include virtual as well as real CESs and illustrate the total number of points of access to the network. There are enough CESs in each system to ensure robust operation and provide alternatives in the event of local failure. These CESs also operate the Inmarsat Ltd space and ground segments for distress alerting, follow-up communications and the promulgation of Maritime Safety Information (MSI).

3.3 **Number of Ship Earth Stations and EPIRBs**

The number of Inmarsat Ship Earth Stations (SESs) commissioned on 31 December 1999 was:

Inmarsat-A	15,687
Inmarsat-B/M	6,966
Inmarsat-C	48,484
Inmarsat-E EPIRBs	401

The number of Inmarsat-C terminals increased significantly during 1999, driven by the requirement for ships subject to SOLAS Chapter IV to fit GMDSS equipment by 1 February 1999. However, the lack of centralised data on the number of ships subject to SOLAS and the status of their radio equipment makes it impossible to correlate this information against the number of Inmarsat-C fittings.

3.4 **Amount of Distress Priority Calls / Alerts through the system**

All distress alerts and calls through the Inmarsat system during the period were handled correctly and delivered promptly. However, it is not technically possible at present to know the actual number of maritime distress calls and alerts that are carried by the system. Inmarsat Ltd is currently developing an automated distress alert monitoring capability that will provide quantitative statistical data on the number of distress priority calls, alerts and messages.

4 **ANALYSES AND CONCLUSIONS**

4.1 This report covers the period since privatisation of Inmarsat. It is understood that maritime business accounts for by far the largest proportion (approximately 75% in 1998) of the total revenue of Inmarsat Ltd. At the same time, Inmarsat Ltd continues to provide maritime distress and safety services for the GMDSS at either no cost or a special rate as the most important public service obligation.

4.2 Whilst Inmarsat Ltd is naturally looking for opportunities to increase its revenues from other than maritime sectors of the market, it is also clear that the company continues to focus on its core maritime sector and on development of maritime mobile satellite communication services as one of the key components of its future commercial activity. It is in the context of these challenges that Inmarsat Ltd is developing a new maritime communications terminal intended for use in the GMDSS. This new terminal equipment is being designed to meet the requirements of IMO Assembly Resolution A.888(21) - Criteria for the Provision of Mobile-Satellite Communication Systems in the GMDSS, including the implementation of priority call handling at four levels of priority in both the ship-to-shore and shore-to-ship directions. The new terminal remains under development and further details will be made public later this year. Significantly, this new terminal may help to mitigate any effects that could arise for the maritime community from the further liberalisation of access to the L-band spectrum by ITU.

4.3 Inmarsat Ltd has recently announced plans for a fourth generation satellite constellation. While these satellites are expected to be technically capable of supporting basic GMDSS services, the company is not currently planning that they should actually be used in this way, and the initial constellation of three Inmarsat-4 satellites is expected to be optimised for land mobile services to particular parts of the world. Also, the existing Inmarsat-3 satellite constellation may be expected to continue in service, supporting the GMDSS, for a minimum of a further ten years and so the provision of satellites for follow-on GMDSS services is not an issue for the immediate

future. However, if they are to be operational before the end of life of the Inmarsat-3 constellation, new satellite designs will need to be begun during the next four or five years.

4.4 The horizons of mobile satellite communications capability are expanding with ever-increasing speed, and there are several different options for the design and capability of new services. The adoption by the IMO Assembly of resolution A.888(21) - Criteria for the Provision of Mobile Satellite Communication Systems in the Global Maritime Distress and Safety System (GMDSS), has provided a clear indication of IMO's intention to consider opening up provision of GMDSS services in the future to other satellite operators. This is most likely to happen in the context of a revision of Chapter IV of SOLAS and will provide the opportunity for specifying more effective services in a way that permits the use of evolutionary capabilities and non-geostationary satellite constellations. In this scenario, Inmarsat Ltd and other potential operators are challenged to develop new systems with more capabilities but including the robust operation that is the essential hallmark of systems used for distress and safety communications.

4.5 Analysis of the figures for the availability of Inmarsat services in each ocean region, tabulated in paragraph 3.1, highlights the fact that annual total figures for availability can disguise single periods of non-availability that are longer than desirable for a primary distress alerting system. The company's attention has therefore been drawn to the need to reduce the length of individual periods of failure as far as it is possible.

4.6 Although there is no formal legal requirement on Inmarsat Ltd to provide on-orbit spare satellites, there is a clear obligation on the company to have a policy in place for the restoration of GMDSS services in the event of the catastrophic failure of one of the operational prime satellites and indeed Inmarsat Ltd has established such policies. In the past, Inmarsat was able to provide such restoration through the use of former-generation spare satellites located in orbit close to the operational primes. IMSO has noted (paragraph 2.2) that, at present, Inmarsat Ltd is now using some former-generation satellites for commercial purposes and has moved these satellites away from their former locations close to the primes. It is possible that this could pose difficulties or delays in the restoration of full GMDSS services if a prime satellite were to fail. Therefore IMSO is seeking further information from the company with relation to this issue.

4.7 The current ITU Radio Regulations provide spectrum for mobile satellite services (MSS) without specifying whether it should be used to provide services to maritime, aeronautical or land-mobile customers - the so-called generic allocation of spectrum. The importance of maritime GMDSS communications within this spectrum is recognised in footnotes to the relevant Radio Regulations, which provide some measure of priority protection for essential distress, safety and other maritime calls. However, in their preparations for the forthcoming World Radiocommunication Conference (WRC-2000), IMO has proposed a return to the former specific allocations for maritime GMDSS communications, while Inmarsat Ltd advocates retention of the existing generic allocations, including footnotes. IMSO believes that the principle of safeguarding GMDSS distress and safety communications has proved to be historically valuable and legitimate and should, in any case, be retained if the footnotes are opened for discussion at WRC-2000.

4.8 In view of the foregoing review of the performance and status of the relevant Inmarsat systems, it is IMSO's overall assessment that, during the period covered by this report, Inmarsat Ltd has continued to provide fully operational maritime mobile satellite distress and safety communication services for the GMDSS and fulfil the company's public service obligation as stated in paragraph 2.1.2 of the PSA. It is also important to note that IMSO has not been able to

detect any reduction or deterioration in the level and quality of service under the new régime compared with the situation prior to privatisation.

5 ACTION REQUESTED OF THE COMMITTEE

5.1 The Maritime Safety Committee is invited to note the contents of this report, and in particular the conclusion that Inmarsat Ltd has continued to provide a sufficient quality of service to meet its obligations under the GMDSS during the period covered by the report, and may wish to forward the report to the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) for further detailed consideration at its next session.

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ANNEX

PUBLIC SERVICE OBLIGATIONS

1 The purpose of IMSO is established in Article 3 of the Convention on the International Mobile Satellite Organization, as amended, as follows:

Article 3

Purpose

The purpose of the Organization is to ensure that the basic principles set forth in this Article shall be observed by the Company, namely:

a) *ensuring the continued provision of global maritime distress and safety satellite communications services, in particular those which are specified in the International Convention for the Safety of Life at Sea, 1974, as amended from time to time, and the Radio Regulations specified in the Constitution and the Convention of the International Telecommunication Union, as amended from time to time, relative to the GMDSS;*

b) *providing services without discrimination on the basis of nationality;*

c) *acting exclusively for peaceful purposes;*

d) *seeking to serve all areas where there is a need for mobile satellite communications, giving due consideration to the rural and the remote areas of developing countries;*

e) *operating in a manner consistent with fair competition, subject to applicable laws and regulations.*

2 IMSO has established a Public Services Agreement (PSA) with the relevant operating companies of Inmarsat. This PSA includes the following provision as a means of giving effect to the requirements of article 3 of the IMSO Convention:

2.1.2 The Company is obliged to continue to make available Space Segment capacity, and to maintain and support applicable Ship Earth Station standards, services and systems, including Inmarsat-A, B, C and E services, and any other Inmarsat standards, services or systems included in, and complying with, requirements of the SOLAS Convention, and related IMO resolutions and performance standards, to enable maritime distress and safety communications to be available to ships at all times and providing the capabilities of:

(a) transmission and reception of distress and safety communications using direct-printing telegraphy, telephony, data communications, initiation and reception of distress priority calls, transmissions of shore-to-ship distress alerts including those directed to specifically defined geographical areas, and transmission and reception of general radio-communications using radiotelephony, direct-printing telegraphy or data communications;

(b) *transmission of maritime safety information by the Inmarsat enhanced group calling system; and*

(c) *transmission by satellite emergency position-indicating radio beacons (satellite EPIRBs) of distress alerts through the Inmarsat geostationary service operating in the 1.6 GHz band.*

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